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## PATENT COOPERATION TREATY

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P61223PC00	<b>FOR FURTHER ACTION</b>	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/NL 03/00633	International filing date (day/month/year) 12.09.2003	Priority date (day/month/year) 13.09.2002
International Patent Classification (IPC) or both national classification and IPC A23L1/28		
Applicant NEDERLANDSE ORGANISATIE VOOR TOEGEPAST- ...et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I  Basis of the opinion
- II  Priority
- III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV  Lack of unity of invention
- V  Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI  Certain documents cited
- VII  Certain defects in the international application
- VIII  Certain observations on the international application

Date of submission of the demand 21.04.2004	Date of completion of this report 14.01.2005
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818, Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer  Boddaert, P Telephone No. +31 70 340-3471



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/NL 03/00633

**I. Basis of the report**

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-14 as originally filed

**Claims, Numbers**

1-12 filed with telefax on 03.09.2004

**Drawings, Sheets**

1/8-8/8 as originally filed

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

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5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).  
*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-7,12
	No: Claims	8-11
Inventive step (IS)	Yes: Claims	1-7
	No: Claims	8-12
Industrial applicability (IA)	Yes: Claims	1-12
	No: Claims	

2. Citations and explanations

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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**Re Item V**

Reference is made to the following documents :

- D1: Food Science , Taiwan (1998), 25(1), 94-103
- D2: JP(A) 09000195
- D3: JP(A) 11000046
- D4: JP(A) 2001028947
- D5: Food Science , Taiwan (1998), 25(4), 497-504
- D6: Journal Of Food Science And Nutrition (2001), 6(1), 16-18
- D7: Journal Of Radiation Research (1987), 28(4), 233-242
- D8: Mushroom Journal (1986), , 68-70
- D9: Journal Of Radiation Research (1979), 20(2), 186-195
- D10: Mycological Research (1998), 102(12), 1459-1483
- D11: Photobiochemistry And Photobiophysic. (1983), 6(4), 239-247

Remark : The terms 'an effective amount'(claim 1) , 'a substantial amount'(claim 4) , 'a shelf life at 10°C of more than 12 days'(claim 9) , 'essentially free'(claim 11) and 'substantially','approximately'(claim 10) are either relative terms or define the subject-matter in terms of the result to be achieved or do not appear to have a precise meaning , contrary to Article 6 PCT. These unclear features have not been taken into account for assessing novelty.

1. Document D6, which is considered to represent the most relevant state of the art (method) , discloses (p. 16-18) a method for preventing or inhibiting the formation of browning in mushrooms by inhibiting the mushroom tyrosinase activity with onion extract ; from which the subject-matter of claim 1 differs in that the mushrooms are exposed to UV-light having an exposure energy in the range of 0.001-0.25 J/cm<sup>2</sup> based on the amount of UV-light.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as finding an improved alternative method for inhibiting or preventing spot formation at the surface of edible mushrooms.

In D6 no hint is given that would solve the problem. Also none of the other prior art documents would lead the skilled person to the solution stated above.

Thus the subject-matter of claim 1 also involves an inventive step (Article 33(3) PCT). Claims 2-7 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

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EXAMINATION REPORT - SEPARATE SHEET**

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2. The present application does not meet the requirements of Article 33(2) PCT because the subject-matter of claims 8-11 is not new.

Claims referring to a product produced by a specific process are admissible only if the products as such fulfill the requirements for patentability. A product is not rendered novel merely by the fact that it is produced by means of a new process.

a. Document D1 discloses (abstract) the decrease in microbial counts of Agaricus bisporus (button mushrooms) when irradiated with ultraviolet-C (UV-C) light. The technical features of claims 9,10 are considered intrinsic features. The surface is free of added preservatives.

The subject-matter of claims 8-11 is therefore not new.

b. Document D2 discloses (abstract) treating mushrooms with ultraviolet light , and is intrinsically considered having a 'shelf life' at 10°C of more than 12 days. The surface is free of added preservatives.

The subject-matter of claims 8-11 is therefore not new.

c. It appears documents D3(abstract) , D4(abstract) and D5(abstract) also deprive claims 8-11 of novelty.

3. The present application does not meet the requirements of Article 33(3) PCT because the subject-matter of claim 12 does not involve an inventive step.

Document D6, which is considered to represent the most relevant state of the art, discloses (p. 16-18) the use of onion extract for preventing or inhibiting the formation of browning in mushrooms by inhibiting the mushroom tyrosinase activity (see also D8 (p.68-70) or D10 (abstract)) ;

from which the subject-matter of claims 12 differs in that UV light is used.

The (objective) problem to be solved by the present invention may therefore be regarded as finding an alternative way to inhibit mushroom tyrosinase.

The solution proposed in claim 12 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons.

The use of UV light to inactivate mushroom tyrosinase is already described in documents D7(abstract) , D9(abstract) or D11(abstract). The skilled person would therefore regard it as a normal option to include this feature in the method and use described in document D6 in order to solve the problem posed.

Thus, the subject-matter of claims 12 does not involve an inventive step and does not satisfy the criterion set forth in Article 33(3) PCT.

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Our letter of 3 September 2004

EPO - DG 1

03. 09. 2004

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(65)

New claims

1. A method for inhibiting or preventing spot formation at the surface of edible mushrooms, wherein the mushrooms are exposed to an effective amount of UV-light, said UV-light having an exposure energy in the range of 0.001-0.25 J/cm<sup>2</sup> based on the amount of UV-light.
- 5 2. A method according to claim 1, wherein the mushrooms are exposed to 0.01-0.15 J/cm<sup>2</sup> exposure energy, based on the amount of UV-light, preferably 0.03-0.1 J/cm<sup>2</sup> exposure energy, based on the amount of UV-light.
3. A method according to any of the preceding claims, wherein the mushrooms are exposed to UV-light coming from a continuous light source.
- 10 4. A method according to any one of the preceding claims, wherein a substantial amount of the UV-light to which the mushrooms are exposed is UV-C light.
5. A method according to any of the preceding claims, wherein the mushrooms are exposed to the UV-light at least prior to harvesting.
- 15 6. A method according to any one of the preceding claims, wherein the mushrooms are button mushrooms.
7. A method according to any one of the preceding claims, wherein the mushrooms are picked in a mechanical manner.
8. A mushroom, obtainable according to the method according to any one of the preceding claims.
- 20 9. A mushroom with a shelf life at 10°C of more than 12 days, preferably of at least 16 days.

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10. A mushroom according to claim 8 or 9, wherein on at least a part of the surface a top layer is present, containing, at least substantially, dead cells, which top layer has a thickness of, on average, approximately 75-175  $\mu\text{m}$ .

11. A mushroom according to any one of claims 8-10, the surface of which is essentially free of added preservatives.

12. The use of UV-light for reducing or preventing formation of brown spots at the surface of an edible mushroom.